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# CLOSED CIRCUIT ESCAPE RESPIRATOR

Presented to Members of the NIOSH NPPTL PPT Program Stakeholders Meeting  
March 29, 2011

FM50

C50

FM53

ST53

ST53<sub>SD</sub>

STPAPR

C420

H550

NH15

## Drivers for a new generation of devices

- Little advancement in re-breather technologies for mining applications in 20 years
- Recent audits of in-service products have demonstrated potential performance & safety issues
- New standard drafted by NIOSH to enhance CCER safety and performance
- Improved designs with modern technologies now being adopted to prevent a recurrence
- Additional user-focused design features to make operation easier and safer in a life threatening event

# NEW GENERATION - COMPRESSED O<sub>2</sub> CCER



## Key Features

- Oxygen-supplying pendulum rebreather
- O<sub>2</sub> delivery system operates on both demand and constant flow
- Incorporates Modern ExtendAir® LiOH CO<sub>2</sub> scrubber
- Unique docking valve allows user to add or exchange breathing devices without breaking seal
- 60-min. & 10-min. breathing durations for the mining community.
- Units weigh 7.0-lbs. and 3.0 lbs. respectively

**60 minute SCSR**

## CO<sub>2</sub> SCRUBBER

- Historically issues with dusting - 'toxic cocktail'
- State-of-the-art technology now available using polymer binders
- More consistency & durability against vibration

Old Technology



Granular CO<sub>2</sub> absorbents

New Technology

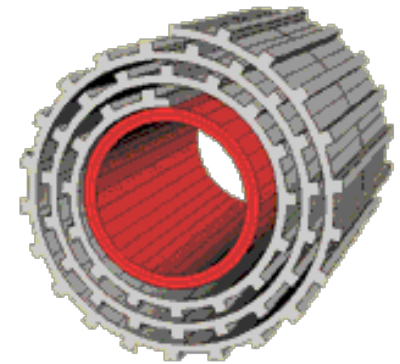


ExtendAir® CO<sub>2</sub>  
absorbent cartridge

# NEW CO<sub>2</sub> SCRUBBER TECHNOLOGY

## ADVANTAGES

- Eliminates dusting common to granules, even with shock and vibration
- Engineered for consistent breathing resistance and CO<sub>2</sub> scrubbing performance
- Exceptional short term water tolerance
- More efficient utilization of absorbent material - up to 500% higher absorption rate than granule
- Duration improvement - 25% to 300% increase with the same mass or volume or same duration with ***smaller, lighter*** scrubber





# DOCKING VALVE FEATURE

*•Allows user to add or exchange air supplies without breaking seal*

1

Closeup of attachment



2

Slide connector fitting into docking valve



3

Connection is made



4

Docking valve can now be turned (opened) to fresh CCER or FSR



5

Spent CCER can be discarded



## USER BENEFITS

1. Safer
2. Longer protection
3. Simple

# Carbon Monoxide Filter Self-Rescuer (CO FSR)

## Current in-service Hopcalite FSR

- ~60-min. duration
- Susceptible to moisture during use
- Can cause discomfort to mouth



## State-of-the-art technology CO FSR

- Long duration (8 hours @ 3,000ppm challenge)
- Resistant to moisture during use
- Uses proprietary precious metal catalyst
- Light weight - nearly half the weight of the current Hopcalite FSR
- Supplied with a flanged fitting for docking CCER for both high CO and low O<sub>2</sub> protection
- **Option** - supplied with a mouth bit for use as a self-contained FSR for CO protection alone



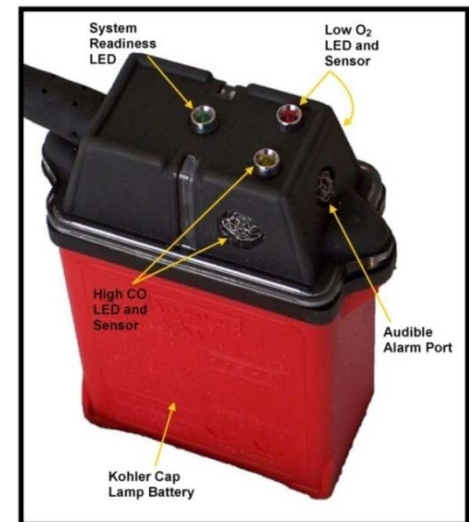
## BREATHING AIR MONITOR (BAM)

- Current devices can be complex, expensive and short-lived for 'global' use
  - Digital display
  - Data logging
  - PC connectivity
  - 2-yr sensor life
  - 2-yr battery life



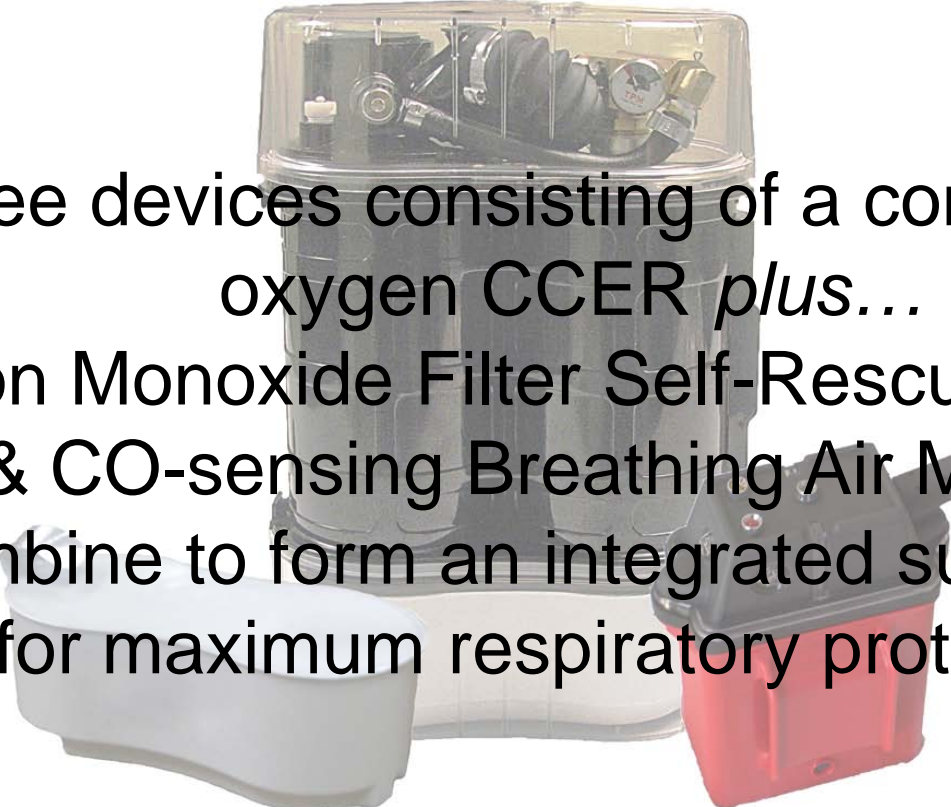
### Alternative

- Low cost Breathing Air Monitor w/ 5-year sensor life measures low O<sub>2</sub> & high CO with LED's and audible alarms
- Is offered as a hand-held device or incorporated in the cap lamp battery as follows:
  - Factory-assembled to new cap lamps or,
  - Provided as an insert for retrofitting legacy batteries
  - Flashed lamp to alert wearer of gas hazards





# HYBRID CCER



Three devices consisting of a compressed oxygen CCER *plus...*  
Carbon Monoxide Filter Self-Rescuer *plus* O<sub>2</sub>  
& CO-sensing Breathing Air Monitor  
that combine to form an integrated survival system  
for maximum respiratory protection

# **HYBRID CCER**

## **FLEXIBLE OPTIONS**

**Use each device individually...**

**Or combine them as an integrated system of survival devices for maximum protection**



Use the  
O2 Self-Contained  
Self-Rescuer (CCER)  
by itself



Or the  
CO Filter Self-Rescuer  
(FSR) by itself



Or the  
CO & O2  
Breathing Air  
Monitor (BAM)  
by itself

# TACTICAL REBREATHER EMERGENCY ENTRY SCBA

- Low profile tactical mask and hose fittings
- Swivel fittings on manifold allow users to split hoses or wear both on same side of mask
- *ExtendAir*™ CO<sub>2</sub> scrubber
- 2-hr. & 4-hr. durations planned
- CBRN or non-CBRN protection
- Draft NIOSH CBRN standard awaited to complete program



Thanks go to NIOSH & CDC

# *Questions?*



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